

08-16-00

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08/15/00

Assistant Commissioner for Patents
Washington, D.C. 20231

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No.: EL 615 575 648 US

Date of Deposit: August 15, 2000

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Sharon Portnoy

SHARON PORTNOY

Attorney Docket No. 970497D/LH

This is a request for filing a

[] Continuation

[X] Divisional

application under 37 CFR 1.53(b), of pending prior application Serial Number 08/907,192
filed on August 6, 1997

of (inventor(s)): T. TOYOFUKU, ET AL

entitled: ELECTRONIC IMAGE PICKUP APPARATUS

1a. [] Enclosed is specification, claims and drawings of the continuation or divisional application with a copy of the Oath or Declaration in the prior application.

1b. [X] Enclosed is a copy of the prior application including a copy of the Oath or Declaration.

1c. [X] A Preliminary Amendment is enclosed.

1d. [] Paper entitled Deletion of Inventor(s) Pursuant to 37 CFR 1.63(d)(2).

2. [X] FEE: The filing fee is calculated below:

Claims as filed, less any claims cancelled by amendment herewith:

	Number Filed		Number Extra	Rate	Calculations
Total Claims	14	-20	=	x \$18.00 =	\$
Independent Claims	5	-3	=	x \$78.00 =	\$ 156.00
MULTIPLE DEPENDENT CLAIMS				+ \$260.00 =	\$
				BASIC FEE	\$ 690.00
				Total of above Calculations	\$ 846.00

3. [X] To the extent not tendered by check, authorization is given to charge any fees under 37 CFR 1.16 and 1.17 during pendency of the application, or to credit any overpayment, to Deposit Account No. 06-1378. Duplicate copy of this letter is enclosed.

4. [X] A check in the amount of \$ 846.00 is enclosed.

5. [X] Cancel claims 1 and 2 (SEE PRELIMINARY AMENDMENT)

6. ☒ Amend the specification by inserting before the first line the sentence: This is a ☐ continuation, ☒ division of application Serial Number 08/907,192 filed August 6, 1997.
7. ☒ New formal drawings are enclosed. 5 Sheets, Figs. 1-12
8. ☒ The prior application is assigned to OLYMPUS OPTICAL CO., INC.
9. ☐ Copies of Verified Statement(s) claiming Small Entity Status filed in said application Serial No. _____
Small entity status is still proper and desired.
10. ☒ Incorporation by Reference: The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 1a or 1b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
11. ☒ The Power of Attorney in the prior application includes the following:

LEONARD HOLTZ, Reg. No. 22,974
THOMAS LANGER, Reg. No. 27,264
RICHARD S. BARTH, Reg. No. 28,180

HERBERT H. GOODMAN, Reg. No. 17,081
MARSHALL J. CHICK, Reg. No. 26,853
DOUGLAS HOLTZ, Reg. No. 33,902

- 12a. ☒ The power appears in the original papers of the prior application.
- 12b. ☐ Since the power does not appear in the original papers, a copy of the power in the prior application is enclosed.
13. ☒ Address all future communications to:
- FRISHAUF, HOLTZ, GOODMAN, LANGER & CHICK, P.C.
767 Third Avenue - 25th Floor
New York, New York 10017-2023
- Tel. No. (212) 319-4900
Fax. No. (212) 319-5101
14. ☒ Priority claim (35 USC 119) is made based upon

Japanese Patent Application No. 8-211443
Filed: August 9, 1996

Certified copy(ies) filed on October 13, 1998
in said application Serial No. 08/907,192

15. ☒ Information Disclosure Statement ☒ PTO-1449
16. ☐ _____

FRISHAUF, HOLTZ, GOODMAN, LANGER & CHICK, P.C.


By: LEONARD HOLTZ
Reg. No.: 22,974

LH:sp

Attorney Docket No. 970497D/LH

**IN THE UNITED STATES PATENT
AND TRADEMARK OFFICE**

Applicant(s): T. TOYOFUKU, ET AL
Division of
Ser. No. : 08/907,192
Filed : HEREWITH
For : ELECTRONIC IMAGE PICKUP
APPARATUS
Prior
Art Unit : 2712
Prior
Examiner : M. White

**PRELIMINARY AMENDMENT AND
INFORMATION DISCLOSURE STATEMENT**

Assistant Commissioner for Patents
Washington, D.C. 20231

S I R :

Please amend the above-identified application, as follows:

IN THE ABSTRACT:

Please cancel the original ABSTRACT OF THE DISCLOSURE and substitute therefor the new ABSTRACT OF THE DISCLOSURE attached hereto as a separate page.

Express Mail Mailing Label

No.: EL 615 575 648 US

Date of Deposit: August 15, 2000

I hereby certify that this paper is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

Sharon Portnoy
SHARON PORTNOY

In the event that this Paper is late filed, and the necessary petition for extension of time is not filed concurrently herewith, please consider this as a Petition for the requisite extension of time, and to the extent not tendered by check attached hereto, authorization to charge the extension fee, or any other fee required in connection with this Paper to Account No. 06-1378.



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IN THE SPECIFICATION:

Delete pages 1 through 4, without prejudice and substitute therefor new replacement pages 1-4 attached hereto:

Page 43, line 7, after "are" insert --only--;
line 8, change "being" to --more easily--;
delete "more better";
change "should" to --are--;
line 9, delete "be";
before "present" insert --scope of--;
line 10, before "structural" insert --specific--;
line 11, after "reference" insert --numerals---.
delete lines 12-15 in their entirety;
line 19, change "housing housing (10)" to
--housing (10) housing--.

Page 44, line 2, change "the center shaft (122a) being prevented" to --wherein--;
delete lines 3-4 in their entirety and substitute therefor: --the main body frame
(20a) prevents the center shaft (122a) from separating from the shaft supporting recess portion (114) within the--;
line 5, change "being" to --is--.

Page 45, line 1, change "housing" (2nd occurrence) to
--which houses--; and change "and
having" to --for electronically picking
up an image, and which has--;
line 12, change "with" to --while--;
line 13, change "being" to --are--;
line 14, after "wherein" insert --:--;
line 25, change ", and is" to --to be--.

Page 46, line 4, change ", and" to --to be--;
line 7, change "so as to engage" to --to cover
at least part of the opening of the
other guide groove after the other end
portion of the lens barrier has been
inserted into the other guide groove,
and engages--;
line 9, delete "and".

Page 47, line 24, after ", " insert --wherein--;
change "having" to --comprises--.

Page 48, line 1, change "the" (2nd occurrence) to --a--;
delete line 2 in its entirety;
line 3, change "the other" to --another--;
line 12, change "of" (2nd occurrence) to --held in--;

line 15, change "an other" to --another--;
line 19, after "(58)" insert --,--;
line 23, change "fist" to --first--.

Page 50, line 25, after "," insert --and--; and change
"are extending" to --area extends--;
line 26, delete ",",.

Page 52, line 2, delete "in a left side of an image
display portion";
line 3, delete "(18a) of the image display means
(18)--";
line 6, delete "and";
between lines 6 and 7, insert:
--the eyepiece window is also
located in a left side of an image
display portion (18a) of the image
display means (18) on the rear surface
area, and--;
line 14, change "its" to --his or her--;
line 16, change "its" to --his or her--;
line 24, after "(26)" insert --which--;
line 26, change "and" to --is also located--.

Page 53, line 1, after "(14c)" insert --which--;
line 4, change "and" to --is also located--;
line 14, change "its thumb of its" to --the thumb
of his or her--;
line 15, change "its" to --his or her--.

IN THE CLAIMS:

Cancel claims 1 and 2, without prejudice, and substitute therefor new claims 3-16, as follows:

--3. An electronic image pickup apparatus comprising:

a main body frame;

a housing which houses the main body frame and which has a battery insertion opening for taking in and out batteries;

a shaft supporting recess portion provided in a position on an inner surface of the housing to face the main body frame and covered with the main body frame within the housing; and

a battery cap having a rotation center shaft rotatably supported by the shaft supporting recess portion on the inner surface of the housing,

wherein the main body frame prevents the center shaft from separating from the shaft supporting recess portion within

15 the housing, and the battery cap is rotatable around the rotation center shaft between a close position for covering the battery opening of the housing and an open position for opening the battery opening.

4. An electronic image pickup apparatus according to claim 3, wherein:

the battery cap has a pair of rotation center shafts arranged concentrically and directed opposite each other;

5 a pair of shaft supporting recess portions having radial direction openings covered with the main body frame within the housing, respectively, are provided in two positions on the inner surface of the housing to face the main body frame, respectively; and

10 the paired rotation center shafts of the battery cap can be rotatably supported by the paired shaft supporting recess portions on the inner surface of the housing.

5. An electronic image pickup apparatus comprising:

a battery holder holding a flat battery at a part of a peripheral surface of the battery and a part of both end surfaces thereof, the flat battery having electrodes on the peripheral surface thereof and on one end surface thereof; and

5 a housing including a battery holder chamber having a battery insertion opening for putting the battery holder in and

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out of the chamber, the battery holder being put in and out of the chamber through the battery holder opening while the peripheral surface of the battery is directed to the battery holder opening, and

wherein the battery holder chamber further comprises a first terminal arranged for contacting one electrode on the peripheral surface of the battery held by the battery holder inserted from the battery holder insertion opening into the chamber, and a second terminal for contacting another electrode on one end surface of the battery held by the battery holder inserted from the battery holder insertion opening into the chamber.

6. An electronic image pickup apparatus according to claim 5, wherein the battery holder chamber of the housing is defined by a peripheral wall protruding from the inner surface of the housing and facing the peripheral surface of the battery held in the battery holder within the battery holder chamber in directions except for a direction facing the battery holder opening, another end surface facing area surrounded by the peripheral wall on the inner surface of the housing and facing the other end surface of the battery of the battery holder within the battery holder chamber, and a fixed side wall fixed to a protruding end of the peripheral wall and facing the one end surface of the battery of the battery holder within the battery

holder chamber, and wherein the first terminal is provided on the
other surface facing area on the inner surface of the housing and
15 the second terminal is provided on the fixed side wall.

7. An electronic image pickup apparatus according to
claim 6, wherein the fixed side wall is made of electric terminal
material and the second terminal is formed by a part of the fixed
side wall.

8. An electronic image pickup apparatus comprising:
a housing which houses image display means for
displaying an image based on an image signal inputted thereto;
and
a tripod support having a tripod hole and provided at
the housing,
wherein the image display means has at least two
protruding pieces protruding in a same direction, and the tripod
support is arranged between at least the two protruding pieces of
10 the image display means within the housing.

9. An electronic image pickup apparatus according to
claim 8, wherein:
the tripod hole of the tripod support is opened in a
cross surface area in the outer surface of the housing, and the
5 cross surface area extends in directions crossing a rear surface

area to which an image display portion of the image display means is exposed, in the outer surface of the housing;

the image display means protrudes the at least two protruding pieces toward the cross surface area within the housing;

a main body frame is housed in the housing; and

the image display means is supported by the main body frame through the at least two protruding pieces.

10. An electronic image pickup apparatus according to claim 8, wherein the image display means comprises a liquid crystal display device.

11. An electronic image pickup apparatus according to claim 9, wherein the image display means comprises a liquid crystal display device.

12. An electronic image pickup apparatus comprising:

a housing which houses a finder unit, electronic image pickup means and image display means, and being provided with an image display operating member for operating the image display means on an outer surface thereof,

wherein:

an eyepiece window of the finder unit is located on a rear surface area, to which the image display portion of the

10

image display means is exposed, in the outer surface of the housing,

the eyepiece window is also located in a left side of an image display portion of the image display means on the rear surface area, and

15

the image display operating member is located in a right side of the image display portion of the image display means on the rear surface area.

13. An electronic image pickup apparatus according to claim 12, wherein the eyepiece window of the finder unit is also located in a vicinity of an upper end of the rear surface area, and the image display operating member is also located in the vicinity of the upper end of the rear surface area.

14. An electronic image pickup apparatus comprising:
a lens unit for imaging an object and producing an electronic pickup image;

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an image display for displaying the image; and
a housing for housing the lens unit and the image display,

wherein the lens unit and the image display are arranged in the housing so as not to overlap each other in a direction along an optical axis of the lens unit.

15. An electronic image pickup apparatus according to claim 14, further comprising an electronic flash, housed in the housing, for emitting light, and

wherein the housing further comprises an electronic flash window for allowing light emitted from the electronic flash to be propagated toward the object, and the electronic flash window is arranged at an upper position of a center portion of a front region in an outer surface of the housing.

16. An electronic image pickup apparatus according to claim 15, further comprising a finder unit for capturing a desired photographic target, said finder unit including a finder eyepiece and being housed in the housing, and

wherein the finder eyepiece and an image display portion of the image display are arranged on a rear region of the outer surface of the housing so as not to overlap each other, and the finder eyepiece is positioned at an upper end position of one end side on the rear region.--

R E M A R K S

The present application is a Divisional Application of allowed parent application Serial No. 08/907,192.

Claims 1 and 2 have been cancelled. New claims 3-16 have been substituted therefor. No new matter has been added. New claims 3-16 are fully supported by the original disclosure. Entry of the new claims is respectfully requested.

A new Abstract has been prepared and is directed to the subject matter of new claims 3-16.

Pages 1-4 of the original specification have been cancelled and new substitute pages 1-4 are attached hereto. New pages 1-4 have been prepared to better accord with the subject matter of new claims 3-16. No new matter has been added. All of the subject matter of new pages 1-4 of the specification is fully supported by the original disclosure.

It is respectfully requested that prosecution on the merits now proceed on the basis of the application as amended herewith.

RE. ADDRESS OF CO-INVENTOR

Applicants hereby inform the Examiner that the residence address of Mr. Kaoru KANEKO has been changed as follows:

2-1816-6 Ogawa-cho
Kodaira-shi
Tokyo, JAPAN

Please correct the Patent Office records accordingly.

INFORMATION DISCLOSURE STATEMENT

Submitted herewith are:

1. Form PTO-892 issued by the Examiner in parent application; and
2. Form PTO-1449 listing the particulars of the documents cited by the Examiner in the parent application, and which were made "of record" in the parent application.

Copies of the publications listed on the attached form PTO-1449 are not supplied herewith. As per 37 CFR 1.98(d), which was effective March 16, 1992, copies of publications listed in an Information Disclosure Statement are not required to be provided if the information was cited or submitted in a prior application.

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The present application properly identifies parent application Serial No. 08/907,192 and relies upon the prior parent application for an earlier filing date under 35 USC 120.

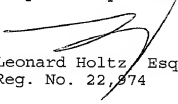
It is respectfully requested that the Examiner consider the publications identified on the attached form PTO-1449 and make them of record, as in the parent application.

It is further requested that the Examiner return an initialled copy of the attached form PTO-1449 to confirm that the publications listed therein have been made of record.

The publications listed on the form PTO-1449 are all relevant since they are "of record" in the parent application which is directed to similar subject matter.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,



Leonard Holtz Esq.
Reg. No. 22,874

August 15, 2000

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LH:sp

TITLE OF THE INVENTION

ELECTRONIC IMAGE PICKUP APPARATUS

CROSS REFERENCE TO RELATED APPLICATIONS:

This is a Divisional Application of U.S. Patent Application
Serial No. 08/907,192, filed August 6, 1997, the entire contents of
which are being incorporated herein by reference. This application
claims the benefit of Japanese Patent Application No. 8-211443 filed
August 9, 1996, the contents of which are incorporated herein by
reference.

BACKGROUND OF THE INVENTION

The present invention relates to an electronic image pickup
apparatus.

Conventionally, an electronic image pickup apparatus for
picking up an image, formed on a charge coupled device by a lens
unit, through the charge coupled device has been well known. In the
electronic image pickup apparatus field, it is always desired to
provide a smaller and lighter apparatus and to facilitate assembly.

BRIEF SUMMARY OF THE INVENTION

The present invention has been made in the above-described
circumstances. It is therefore an object of the present invention
to provide an electronic image pickup apparatus which is smaller and
lighter than the conventional apparatus and which can be easily
assembled.

In order to achieve the above described object of this
invention, an electronic image pickup apparatus according to the
invention comprises a main body frame; a housing which houses the
main body frame and which has a battery insertion opening for taking
in and out batteries; a shaft supporting recess portion provided in
a position on an inner surface of the housing to face the main body
frame and covered with the main body frame within the housing; and a

battery cap having a rotation center shaft rotatably supported by the shaft supporting recess portion on the inner surface of the housing, wherein the main body frame prevents the center shaft from separating from the shaft supporting recess portion within the housing, and the battery cap is rotatable around the rotation center shaft between a close position for covering the battery opening of the housing and an open position for opening the battery opening.

With this structure, the batter cap can be easily and surely rotatably mounted on the housing, while the electronic image pickup apparatus is smaller and lighter than the conventional apparatus and is easily assembled.

In accordance with the above-described object of this invention, another electronic image pickup apparatus according to the invention comprises a battery holder holding a flat battery at a part of a peripheral surface of the battery and a part of both end surfaces thereof, the flat battery having electrodes on the peripheral surface thereof and on one end surface thereof; and a housing including a battery holder chamber having a battery insertion opening for putting the battery holder in and out of the chamber, the battery holder being put in and out of the chamber through the battery holder opening while the peripheral surface of the battery is directed to the battery holder opening. The battery holder chamber further comprises a first terminal arranged for contacting one electrode on the peripheral surface of the battery held by the battery holder inserted from the battery holder insertion opening into the chamber, and a second terminal arranged for contacting another electrode on one end surface of the batter held by the battery holder inserted from the battery holder insertion opening into the chamber.

With this structure, the battery holder chamber of the housing

can easily and surely hold the battery holder with the flat battery being held by the battery holder, while the electronic image pickup apparatus is smaller and lighter than the conventional apparatus and is easily assembled.

5 In accordance with the above described object of this invention, another electronic image pickup apparatus according to the invention comprises a housing which houses image display means for displaying an image based on an image signal inputted thereto; and a tripod support having a tripod hole and provided at the
10 housing, wherein the image display means has at least two protruding pieces protruding in the same direction, and the tripod support is arranged between at least the two protruding pieces of the image display means within the housing.

With this structure, the image display means and the tripod support can be arranged as close as possible to each other, and then the electronic image pickup apparatus can be made smaller and lighter than the conventional apparatus and is easily assembled.

10 In accordance with the above described object of this invention, another electronic image pickup apparatus comprises a housing which houses a finder unit, electronic image pickup means and image display means, and being provided with an image display operating member for operating the image display means on an outer surface thereof, wherein: an eyepiece window of the finder unit is located on a rear surface area, to which the image display portion
20 of the image display means is exposed, in the outer surface of the housing, the eyepiece window is also located in a left side of an image display portion of the image display means on the rear surface area, and the image display operating member is located in a right side of the image display portion of the image display means on the
25 rear surface area.

With this structure, the finder unit, the electronic image pickup means and the display means can be arranged as close as possible to each other on the rear surface area of the housing without deteriorating operations thereof, and then the electronic image pickup apparatus can be made smaller and lighter than the conventional apparatus and to be easily assembled.

In accordance with the above described object of this invention, another electronic image pickup apparatus according to the invention comprises a lens unit for imaging an object and producing an electronic pickup image; an image display for displaying the image; and a housing which houses the lens unit and the image display, wherein the lens unit and the image display are arranged in the housing so as not to overlap each other in a direction along an optical axis of the lens unit.

With this structure, the lens unit and the image display can be arranged as close as possible to each other in the housing, while the electronic image pickup apparatus can be made smaller and lighter than the conventional apparatus and is easily assembled.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

The accompanying drawings, which are incorporated in and constitute a part of the specification,

COPY

- 1 -

COPY

TITLE OF THE INVENTION

ELECTRONIC IMAGE PICKUP APPARATUS

BACKGROUND OF THE INVENTION

5 The present invention relates to an electronic image pickup apparatus.

Conventionally, an electronic image pickup apparatus for picking up an image, formed on a charge coupled device by a lens unit, though the charge coupled device has been well known. In the electronic
10 image pickup apparatus field, it is always desired to provide a smaller and lighter apparatus and to facilitate assembly.

BRIEF SUMMARY OF THE INVENTION

The present invention has been made in the above-described circumstances. It is therefore an object of
15 the present invention to provide an electronic image pickup apparatus which is smaller and lighter than the conventional apparatus and which can be easily assembled.

20 To attain the above-described object, the electronic image pickup apparatus according to the present invention comprises: a housing for housing a lens unit and having a lens opening for introducing light into the lens unit; a pair of guide grooves
25 extending parallel with each other while putting the lens opening between the guide grooves on an outer surface of the housing; and a lens barrier having both

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end portions engaged with the paired guide grooves and moving while being guided by the paired guide grooves between a close position for closing the lens opening and an open position for opening the lens opening.

5 One of the paired guide grooves opens in a cross direction crossing a front direction to which a front surface area, in which the lens opening is formed on the outer surface of the housing, is directed, and the other of the paired guide grooves opens in the front direction on the outer surface of the housing. One end portion of the both end portions of the lens barrier corresponding to the one guide groove is inserted into and engaged with the one guide groove, and is slidable along the one guide groove. The other end portion of 15 the both end portions of the lens barrier corresponding to the other guide groove is inserted into and engaged with the other guide groove, and slidable along the other guide groove. A separation protection member engaged with the other end portion of the lens barrier 20 in the front direction and preventing the other end portion of the lens barrier from separating from the opening of the other guide groove, is fixed on the outer surface of the housing.

In the electronic image pickup apparatus according to the present invention and having such a structure, 25 to slidably engage the both end portions of the lens barrier with the pair of guide grooves on the outer

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surface of the housing, prior to fixing the separation protection member to the outer surface of the housing, one of the end portions of the lens barrier corresponding to one guide groove is inserted into the one guide groove in the cross direction crossing the front direction, to which the front surface area in which the lens opening is formed on the outer surface of the housing, is directed. And the other end portion of the lens barrier corresponding to the other guide groove is inserted into the other guide groove in a direction opposite to the front direction. Thereafter, the separation protection member is fixed to the outer surface of the housing.

Thus, there is no need to apply strong force to the assembly (which means engaging the both end portions of the lens barrier with the pair of guide grooves on the outer surface of the housing in the electronic image pickup apparatus according to the present invention). The fact that no strong force is applied to the both end portions of the lens barrier during assembly can not only facilitate the assembly but also make simple the structure of the lens barrier. As a result, the present invention can provide a simpler, lighter electronic image pickup apparatus than the conventional apparatus.

In the electronic image pickup apparatus according to the present invention and having the above-described

structure, it is preferable that the one guide groove is formed in a lower surface area located below the front surface area on the outer surface of the housing and extending in a direction crossing the front surface area, and that the other guide groove is formed in the front surface area on the outer surface of the housing.

With such a structure, when observing the housing of the electronic image pickup apparatus while facing the lens opening in the front surface area, that is, observing the housing in the opposite direction, the one guide groove cannot be seen and also the other guide groove cannot be seen due to the presence of the separation protection member and a decorative sheet fixed on the outer surface of the housing. Thus, the housing of the electronic image pickup apparatus presents a streamlined appearance.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

The accompanying drawings, which are incorporated in and constitute a part of the specification,

illustrate presently preferred embodiments of the invention, and together with the general description given above and the detailed description of the preferred embodiments given below, serve to explain the principles of the invention.

FIG. 1 is a perspective view schematically showing an obliquely upper front appearance of an electronic image pickup apparatus in one embodiment according to the present invention, in which a lens barrier of the apparatus is in a close position;

FIG. 2 is a perspective view schematically showing a part of the electronic image pickup apparatus of FIG. 1, in which the lens barrier of the apparatus is in an opening position;

FIG. 3 is a perspective view schematically showing an obliquely upper rear appearance of the electronic image pickup apparatus of FIG. 1;

FIG. 4 is an exploded perspective view of the electronic image pickup apparatus shown in FIG. 1;

FIG. 5 is a perspective view showing an obliquely upper rear appearance of a main body block shown in FIG. 4;

FIG. 6 is a top view showing an arrangement of a main body frame of the main body block, a finder unit, a photographic lens unit, an image display means, an electric flash substrate, an external interface substrate, an image pickup substrate, an image display

operating substrate and a main substrate within
a housing of the electronic image pickup apparatus
shown in FIG. 1;

FIG. 7 is an enlarged exploded perspective view of
5 an auxiliary power supply battery holder chamber shown
in FIG. 4;

FIG. 8 is a partial cross-sectional view showing
a positional relationship between the auxiliary power
supply battery holder chamber shown in FIG. 4 and the
10 main body frame within the housing shown in FIG. 1;

FIG. 9 is a cross sectional view almost along
the finder unit and the photographic lens unit located
at the left end portion (right end portion in FIG. 1)
of the electronic image pickup apparatus, showing
15 a structure for sliding movement of the lens barrier of
the electronic image pickup apparatus in the embodiment
according to the present invention between the close
position shown in FIG. 1 and the open position shown in
FIG. 2;

FIG. 10 is a schematic cross-sectional view
showing a conventional structure for sliding movement
of a conventional lens barrier between its close
position and its open position;

FIG. 11 is an enlarged, cross-sectional view
25 showing a battery insertion opening formed at a right
end portion (left end portion in FIG. 1) in a lower
surface area on an outer surface of a front housing

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member of FIG. 1 and showing a bearing structure for supporting a battery cap to be rotatable between a close position in which the battery cap covers the battery opening and an open position in which the battery cap opens the battery opening; and

FIG. 12 is an enlarged, exploded perspective view of the battery opening and the bearing structure of the battery cap of FIG. 11.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is a perspective view schematically showing an obliquely upper front appearance of an electronic image pickup apparatus shown according to an embodiment of the present invention, in which a lens barrier of the apparatus is in a closed position. FIG. 2 is a perspective view schematically showing a part of the electronic image pickup apparatus of FIG. 1, in which the lens barrier of the apparatus is in an open position. FIG. 3 is a perspective view schematically showing an obliquely upper rear appearance of the electronic image pickup apparatus of FIG. 1.

In this embodiment, the electronic image pickup apparatus is a so-called digital camera for picking up an image by using a photoelectric transfer device such as a CCD (Charge Coupled Device), as an electronic image pickup means.

As shown in FIG. 1, a housing 10 of the electronic image pickup apparatus has a front housing member 12

and a rear housing member 14 which are detachably connected with each other. The front housing member 12 and the rear housing member 14 are made of synthetic resin such as polycarbonate resin and ABS resin.

5 A right end portion in a front surface area on an outer surface of the front housing member 12 (left end portion in FIG. 1) is expanded forward so that a user can easily catch the housing 10 with its right hand. A grip rubber 12a is attached on the right end portion in the front surface area to prevent the user's right fingers from slipping thereon with its sweat.

10 An inside of the expanded right end portion provides a battery storage space for storing main power supply batteries. A battery insertion opening for putting the main power supply batteries in and out of the space is provided in a right end portion in a lower surface area on the outer surface of the front housing member 12 (left end portion in FIG. 1). A battery cap is supported in the opening so as to be rotatable

15 between open and close positions. The battery insertion opening, the battery cap and a bearing structure for the battery cap will be described later in detail.

20 A decorative sheet 12b is attached on an upper end portion in the front surface area on the outer surface of the front housing member 12 from almost a center of the upper end portion to a left end thereof (right end

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in FIG. 1). An electronic flash window 12c, a self-timer display window 12d and a viewfinder window 12e are formed in the decorative sheet 12b in this order from its center to its left end. An electronic flash opening, a self-timer display opening and a viewfinder opening (not shown) corresponding to the electronic flash window 12c, the self-timer display window 12d and the viewfinder window 12e on the decorative sheet 12b are formed in an upper end portion in the front surface area of the outer surface of the front housing member 12 corresponding to the decorative sheet 12b.

A lens barrier 16 is arranged below the decorative sheet 12b in the front surface area on the outer surface of the front housing member 12. The lens barrier 16 is slidable along the front surface area between a first position and a second position. In this first position, the lens barrier 16 is located under the self-timer display window 12d and the viewfinder window 12e and away from the left end (right end in FIG. 1) of the front surface area as shown in FIG. 1, and in the second position the lens barrier 16 is located rightward from the first position and reaches the left end of the front surface area as shown in FIG. 2.

A lens opening 12f is formed under the viewfinder window 12e in the front surface area as shown in FIG. 2. The lens barrier 16 located in the first position shown

in FIG. 1 closes the lens opening 12f. The lens barrier 16 located in the second position shown in FIG. 2 opens the lens opening 12f. Thus, the first position of the lens barrier 16 shown in FIG. 1 is a close position and the second position thereof shown in FIG. 2 is an open position.

The sliding movement of the lens barrier 16 between the close position and the open position is performed by engaging upper and lower ends of the lens barrier 16 with a first guide groove (not shown) in the front surface area on the outer surface of the housing 10 and a second guide groove (not shown) in a lower surface area on the outer surface of the housing 10. The first guide groove is covered by the decorative sheet 12b, and the second guide groove located in a front end portion in the lower surface area on the outer surface of the housing 10 and extends from almost a center of the front end portion to a left end thereof (right end in FIG. 1) in parallel to the first guide groove. Structures of the first and second guide grooves and those of the upper and lower end portions of the lens barrier 16 slidably engaged with the guide grooves will be described later in detail.

As shown in FIG. 1, a photographic information display window 12g is provided in almost a center of a rear end portion in an upper surface area on the outer surface of the front housing member 12. In the housing

10, photographic information display means such as a liquid crystal display device is provided to correspond to the photographic information display window 12g. The photographic information display means displays various information of the electronic image pickup apparatus (such as setting and setting release of a self-timer mode various flash modes, a continuous photographic mode and photographic record delete mode, the number of frames, the residual quantity of the main power supply batteries, etc.). The various information displayed on the photographic information display means can be seen from the outside of the housing 10 through the photographic information display window 12g. Various operation buttons 12h for selecting the various information displayed on the photographic information display means are arranged on both sides of the photographic information display window 12g on the rear end portion in the upper surface area.

A shutter button 12i is arranged on a forwardly expanded right end portion (left end portion in FIG. 1) of the upper surface area in the outer surface of the front housing member 12.

A terminal protection cover 12j is provided in a left end surface area (right end surface area in FIG. 1) on the outer surface of the front housing member 12 to be capable of freely opening and closing. A signal input/output terminal and an external power

supply input terminal are hidden on a back side of the terminal protection cover 12j.

As shown in FIG. 3, an image display window 14a is formed in almost a center of a rear surface area on an outer surface of the rear housing member 14, and an image display portion (i.e. screen) of image display means 18 such as a liquid crystal display device stored in the housing 10 is exposed in the image display window 14a. A finder eyepiece window 14b is arranged in the left of the image display window 14a on an upper end portion in the rear surface area on the outer surface of the rear housing member 14. A plurality of image display operation buttons 14c for operating the image display means 18 are arranged in the right of the finder eyepiece window 14a on the upper end portion on the rear surface area.

FIG. 4 is an exploded, perspective view of the electronic image pickup apparatus of FIG. 1. It shows the front housing member 12, the rear housing member 14 separated from the front housing member 12 and a main body block 20 usually stored between the front housing member 12 and the rear housing member 14.

The main body block 20 comprises a main body frame 20a having a projection surface almost equal to a front surface area on an inner surface of the front housing member 12 and a rear surface area on an inner surface of the rear housing member 14. In the main body frame

20a, a light emitting portion 22 of electronic flash light emitting means is provided in a position corresponding to the electronic flash window 12c of the front housing member 12. The light emitting portion 22 includes a Xenon discharge tube and a light reflection umbrella.

In the main body frame 20a, front ends of a light emitting device 24 for displaying an operation of a self-timer and a finder unit 26 are arranged in positions corresponding to the self-timer display window 12d and the viewfinder window 12e of the front housing member 12, respectively. A rear end of the finder unit 26 corresponds to the finder eyepiece window 14b of the rear housing member 14.

In the main body frame 20a, a photographic lens unit 28 is arranged in a position located below the finder unit 26 and corresponding to the lens opening 12f of the front housing member 12. Electronic image pickup means using a photoelectric transfer device such as a CCD (Charge Coupled Device) is incorporated in an inner end of the photographic lens unit 28.

In the main body frame 20a, the above described signal input/output terminal 30 and the above described external power supply input terminal 32 located in the back side of the terminal protection cover 12j in the left end surface area on the outer surface of the front housing member 12 are arranged in the left (right in

FIG. 4) of the finder unit 26 and in that of the photographic lens unit 28.

In the main body frame 20a, a booster 34 for increasing a predetermined voltage from the main power supply batteries to another predetermined voltage to drive respective circuits and an electronic flash capacitor 36 for storing electric charges to emit light from the electronic flash light emitting means are arranged below the light emitting portion 22. Further, in the main body frame 20a, an electronic flash substrate 38 is arranged in an area facing the front surface area on the inner surface of the front housing member 12 to extend from the booster 34 arranged almost in a center in a lateral direction of the main body frame 20a to the left end (right end in FIG. 4) thereof, so as not to contact the electronic flash capacitor 36, the photographic lens unit 28, the signal input/output terminal 30 and the external power supply input terminal 32. A well known circuit for controlling the operation of the electronic flash light emitting means is provided on the electronic flash substrate 38.

Furthermore, a right end portion (left end portion in FIG. 4) of the main body frame 20a extending from the booster 34 almost in the center in the lateral direction of the main body frame 20a to the right end (left end in FIG. 4) cooperates with the forwardly expanded right end portion (left end portion in FIG. 4)

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in the front surface area of the front housing member 12 to define a barrier plate for defining a battery storage space 40 for storing a plurality of main power supply batteries (not shown). A plurality of contact terminals 42 for the main power batteries (not shown) stored in the battery storage space 40 are provided on the upper right end portion (upper left end portion in FIG. 4) of the main body frame 20a.

The battery opening of the battery storage space 40 is formed in the right end portion (left end portion in FIG. 1) in the lower surface area on the outer surface of the front housing member 12. As described before, the battery opening and the battery cap thereof will be described later in detail.

In the main body frame 20a, an external interface substrate 44 connected to the signal input/output terminal 30 and to the external power supply input terminal 32 is arranged in a portion corresponding to a right side of the image display window 14a in the rear surface area on the inner surface of the rear housing member 14.

A switch/display substrate 46 is arranged on an upper end of the main body frame 20a to correspond to an upper surface area on the inner surface of the front housing member 12. A shutter operating switch 48 is arranged on the switch/display substrate 46 in a position corresponding to the shutter button 12i in

the upper surface area on the outer surface of the front housing member 12 to be operated by the shutter button 12i. Information display means 50 such as a liquid crystal display device and various operation switches 52 are further arranged on the switch/display substrate 46 to correspond to the photographic information display window 12g and the various operating buttons 12h in the upper surface area on the outer surface of the front housing member 12, respectively.

A plurality of connector pieces 54 and a plurality of engaging pieces 56 are formed on a peripheral portion of the rear surface area on the inner surface of the rear housing member 14. The connector pieces 54 are used for connecting the rear housing member 14, together with the main body block 20, with the front housing member 12 by using fixed screws (not shown), and the engaging pieces 56 are used for engaging the rear housing member 14 with predetermined positions of the front housing member 12.

An auxiliary power supply battery holder chamber 58 for detachably holding an auxiliary power supply battery is provided on a lower right corner portion in the rear surface area on the inner surface of the rear housing member 14. A structure of the auxiliary power supply battery holder chamber 58 will be described later in detail.

A lower surface area on the inner surface of the rear housing member 14 is a cross surface area extending in a direction crossing the rear surface area on the inner surface of the rear housing member 14.

5 In the lower surface area, a tripod support 60 having a tripod hole formed in a lower surface area (i.e. cross surface area) on the outer surface of the rear housing member 14 is formed in a position corresponding to almost the center of the image display window 14a in
10 the lateral direction.

FIG. 5 is a perspective view showing an obliquely upper rear appearance of the main body block 20 of FIG. 4.

As shown in FIG. 5, an image pickup substrate 62
15 is arranged in a back side of the external interface substrate 44 in the main body frame 20a of the main body block 20. On the image pickup substrate 62, a circuit for controlling the photographic lens unit 28 (see FIG. 4) and the electronic image pickup means
20 (not shown) using the photoelectric transfer device such as a CCD (Charge Coupled Device) as mentioned above is formed.

In the main body frame 20a, the image display means 18 is arranged in a position corresponding to
25 the image display window 14a in the rear surface area on the inner surface of the rear housing member 14. The image display means 18 has a flat rectangular shape.

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Mounting pieces 64 are protruded in upper and lower directions (that is, toward the upper surface area and the lower surface area on the inner surface of the rear housing member 14, each of these upper and lower surface areas serving as the cross surface area extending in the direction crossing the rear surface area in which the image display window 14a is formed) from right and left ends of each of upper and lower edges of the image display means 18. The upper and lower mounting pieces 64 of the image display means 18 are fixed to predetermined image display means fixing members 20b of the main body frame 20a by fixing screws (not shown). The upper and lower mounting pieces 64 facilitate a fixing work for fixing the image display means 18 to the main body frame 20a, thereby facilitating assembling of the electronic image pickup apparatus of this embodiment.

As described above, when the main body block 20, together with the rear housing member 14, is connected to the front housing member 12 and is housed in a predetermined position in the housing 10, the tripod support 60 in the lower surface area on the inner surface of the rear housing member 14 is arranged below the image display means 18 of the main body block 20 between a pair of mounting pieces 64 of the lower edge of the image display means 18, as shown in two-dot chain line in FIG. 5.

Since the tripod support 60 is arranged in a usually unused space arranged below the image display means 18 between the paired mounting pieces 64 of the lower edge of the image display means 18 in the housing 10, the space in the housing 10 can be used more effectively. As a result, there is no need to increase the thickness and height of the housing 10 for arranging the tripod support 60 in the housing 10 and there is thereby no need to increase the outer dimensions and the weight of the housing 10. (This contributes to make the electronic image pickup apparatus of this embodiment smaller and lighter than the conventional one.) Besides, the housing 10 can provide enough space for an arrangement of various components, thereby facilitating the assembly of the electronic image pickup apparatus of this embodiment.

On a right side of the image display means 18 in the main body frame 20a, a booster 66 is arranged. The booster 66 is used for increasing a predetermined voltage from the main power supply batteries (not shown) stored in the battery storage space 40 on the right end portion (left end portion in FIG. 4) in the front surface of the main body frame 20a shown in FIG. 4, to another predetermined voltage required for the image display means 18.

Above the booster 66 in the main body frame 20a, an image display operation substrate 70 is arranged.

A plurality of image display operating switches 68 are arranged on the substrate 70 so as to be operated by a plurality of image display operating buttons 14c (see FIG. 3) arranged on the upper end portion in the rear surface area of the outer surface of the rear housing member 14.

A main substrate 72 including a central processing unit (not shown) for controlling the operation of the electronic image pickup apparatus of this embodiment is arranged on a front side of the image display means 18 in the main body frame 20a.

FIG. 6 is a top view schematically showing an arrangement of the main body frame 20a, the finder unit 26, the photographic lens unit 28, the image display means 18, the electronic flash substrate 38, the external interface substrate 44, the image pickup substrate 62, the image display operation substrate 70 and the main substrate 72 in the housing 10.

As shown in FIG. 6, the image display operation substrate 70 is located on the right side of the image display means 18, the finder eyepiece portion 14b of the finder unit 26 is located on the left side of the image display means 18 and the photographic lens unit 28 is located below the finder unit 26 on the left side of the image display means 18 in the housing 10.

Furthermore, the image display operation substrate 70 is located in the upper end portion on the rear

surface area of the housing 10 in the right side of the image display means 18, the finder eyepiece portion 14b, that is, the finder unit 26 is located in the upper end portion on the rear surface area of the housing 10 in the left side of the image display means 18. Therefore, the housing 10 can provide a space for housing the photographic lens unit 28 below the finder unit 26 on the left side of the image display means 18.

Since the image display means 18 and the photographic lens unit 28 usually having a relatively large thickness do not overlap each other in a direction along an optical axis of the photographic lens unit 28, it is possible to reduce the outer dimensions or particularly the thickness of the housing 10 (a dimension in back and forth directions of the housing 10).

In the following description, the operation of the electronic image pickup apparatus of the embodiment according to the present invention and having the structure outlined above with reference to FIGS. 1 through 6, will be described.

A user of the above-described electronic image pickup apparatus holds the right end portion of the housing 10 with its right hand and moves the lens barrier 16 on the front surface of the housing 10 with its left hand from the close position shown in FIG. 1 to the open position in FIG. 2. This movement of the

lens barrier 16 makes a main power supply switch turn on so that an image formed on the electronic image pickup means by the photographic lens of the photographic lens unit 28 is converted into an electric signal by the electronic image pickup means. The image formed on the electronic image pickup means can be displayed on the image display portion (that is, screen) 18a of the large image display means 18 shown in FIG. 3 by operating the plurality of image display operating buttons 14c on the rear surface of the housing 10. By turning on the main power supply switch, predetermined various information (such as the number of frames, the residual quantity of the main power supply batteries, etc. at present) relating to the electronic image pickup apparatus is displayed on the small photographic information display window 12g (shown in FIG. 1) on the upper surface of the housing 10. The predetermined various information displayed on the information display window 12g is changed by operating the various operating buttons 12h (shown in FIG. 1) on the upper surface of the housing 10.

When the user presses the shutter button 12i at a desired timing while the user presses its right eye on the finder eyepiece portion 14b to catch a desired photographic target (an object) through the finder 26 or observes an image displayed on the image display portion (that is, screen) 18a of the image display

means 18, the image of the object at this moment is stored in a memory on the main substrate 72.

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The image stored in the memory can be displayed on the image display portion (that is, screen) 18a of the large image display means 18 (shown in FIG. 3) by
5 operating the plural image display operating buttons 14c (shown in FIG. 3) on the rear surface of the housing 10. In this operation, the user can operate the plural image display operating buttons 14c by using
10 only its right thumb while the user holds the right end portion of the housing 10 with its right hand.

In other words, as shown in FIG. 3, since the finder eyepiece portion 14b is located in the left side of the image display means 18 and the plural image
15 display operating buttons 14c (serving as image display operating members) are located in the right side of the image display means 18 on the rear surface of the housing 10, the user can carry out both the photographic operation and the reproduction operation by
20 using only its right hand while holding the right end portion of the housing 10 with its right hand, by the photographic operation the shutter button 12i being depressed while catching a desired photographic target
(an object) through the finder unit 26 or observing the
25 image displayed on the image display portion (that is, screen) 18a of the image display means 18 and by the reproduction operation the image stored in the memory

being displayed on the image display portion (that is, screen) 18a of the large image display means 18 in the electronic image pickup apparatus of this embodiment. Consequently, it is possible to easily use the electronic image pickup apparatus of this embodiment.

When the image stored in the memory is not necessary, it can be erased from the memory by operating the various operating buttons 12h (shown in FIG. 1) on the upper surface of the housing 10.

The above-mentioned reproduction and erase operations can be conducted while the lens barrier 16 is located in the close position. That is, even if the main power supply switch is turned off while the lens barrier is located in the close position, the main power supply switch can be turned on by operating the plural image display operating buttons 14c and the reproduction operation for displaying the image stored in the memory can be displayed on the image display portion (that is, screen) 18a of the large image display means 18 shown in FIG. 3. In addition, in this state, the erase operation for erasing unnecessary images stored in the memory from the memory can be performed by operating the various operating buttons 12h (shown in FIG. 1) on the upper surface of the housing 10.

Moreover, if desired flash mode or self-timer mode is set in the above electronic image pickup apparatus

by operating the various operating buttons 12h (shown in FIG. 1) on the upper surface of the housing 10 before pressing the shutter button 12i, the electronic image pickup apparatus can be operated in the desired flash mode or self-timer mode when pressing the shutter button 12i. It is also possible to change or release the flash mode now being set or release the self-timer mode by operating the various operating buttons 12h.

If the terminal protection cover 12j (shown in FIG. 1) on the left end surface (right end surface in FIG. 1) of the housing 10 is opened and a signal input/output terminal connector (not shown) is connected to the signal input/output terminal 30 shown in FIGS. 3 and 5, the image stored in the memory can be outputted to, for example, an external computer or image processing apparatus such as a printing machine. If an external power supply connector (not shown) is connected to the external power supply input terminal 32 shown in FIGS. 3 and 5, the main power supply for the electronic image pickup apparatus of this embodiment is instantly changed from the main power supply batteries (not shown) in the battery storage space 40 (see FIG. 4) in the right end portion (left end portion in FIG. 1) of the housing 10, to the external power supply, thereby preventing the consumption of the main power supply batteries (not shown). Additionally, if the external power supply

connector (not shown) is separated from the external power supply input terminal 32 shown in FIGS. 3 and 5, the main power supply for the electronic image pickup apparatus of this embodiment is instantly changed from
5 the external power supply to the main power supply batteries (not shown) in the battery storage space 40 (see FIG. 4) in the right end portion (left end portion in FIG. 1) of the housing 10.

A structure of the auxiliary power supply battery holder chamber 58 shown in FIG. 4 will now be described
10 with reference to FIGS. 7 and 8.

FIG. 7 illustrates an enlarged, perspective exploded view of the auxiliary power supply battery holder chamber 58 shown in FIG. 4. FIG. 8 illustrates
15 a partial cross-sectional view showing a positional relationship between the auxiliary power supply battery holder chamber 58 of FIG. 4 and the image pickup substrate 62 of the main body frame 20 in the housing 10.

An auxiliary battery 74 housed in the auxiliary power supply battery holder chamber 58 has a disc like shape and has one electrode on a periphery thereof and another electrode on one end surface thereof.
20 The auxiliary power supply battery 74 is used for
25 backing up the various circuits used in the electronic image pickup apparatus of this embodiment.

The auxiliary power supply battery holder chamber

58 has a flat battery holder 76b having a pair of clipping arms 76a of an almost U-shape. The flat battery holder 76b detachably holds one part of the periphery and one part of a peripheral edge portion of one end surface of the auxiliary power supply battery 74 by the paired clipping arms 76a between the arms 76a. Therefore, in the battery holder 76b, the other part of the periphery of the auxiliary power supply battery 74 is exposed in a direction in which tip ends of the paired clipping arms 76a extend and both end surfaces of the auxiliary power supply battery 74 is exposed between the paired clipping arms 76a.

The battery holder 76b is made of non conductive, elastic material such as synthetic resin. Engaging recesses 76c are formed on opposing side surfaces of tip end portions of the paired clipping arms 76a.

The auxiliary power supply battery holder chamber 58 further has a battery holder insertion opening 78 for taking the battery holder 76b into and out from the chamber 58. The opening 78 is formed along the rear surface area in the left end portion (right end portion in FIG. 4) of the lower surface area of the rear housing member 14 of the housing 10. The battery holder 76b holding the auxiliary power supply battery 74 is taken into and out from the chamber 58 through the battery holder insertion opening 78 while the periphery of the auxiliary power supply battery 74 is

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predetermined position within the housing 10. The one end surface on which one electrode of the auxiliary power supply battery 74 is provided faces a fixed side wall 86 detachably fixed to a protruding end of the peripheral wall 80 by well-known fixing means 84 such as a fixing screw.

Namely, the auxiliary power supply battery holder chamber 58 is defined by the peripheral wall 80 formed in the rear surface area of the inner surface of the rear housing member 14, the other end surface facing area 82 surrounded by the peripheral wall 80 on the rear surface area of the inner surface on of the rear housing member 14 and the fixed side wall 86 detachably fixed to the protruding end of the peripheral wall 80 by the well-known fixing means. A first terminal 88 is provided on the other end surface facing area 82, and a second terminal 90 is provided on the fixed side wall 86. The first terminal 88 contacts the other part of the periphery of the auxiliary power supply battery 74, the other part being exposed in the direction in which the tip ends of the paired clipping arms 76a of the battery holder 76b are directed and being the one electrode of the battery 74. The second terminal 90 contacts the other part of the one end surface of the auxiliary power supply battery 74, the other part being exposed between the paired clipping arms 76a of the battery holder 76b and being the other electrode of the

battery 74.

The second terminal 90 is formed by punching the fixed side wall 86 made of a conductive, elastic material. The second terminal 90 may be formed by
5 fixing a terminal piece of conductive, elastic material to the fixed side wall 86 made of non-conductive material.

In this embodiment, since the first and second terminals 88 and 90 for the electrodes of the auxiliary power supply battery 74 held by the battery holder 76b inserted through the battery holder insertion opening 78 into the auxiliary power supply battery holder chamber 58 of the housing 10, are provided on the other end surface facing area 82 surrounded by the peripheral
10 wall 80 in the rear surface area of the rear housing member 14 and on the fixed side wall 86 fixed to the protruding end of the peripheral wall 80 in the rear surface area of the rear housing member 14, the
15 electronic image pickup apparatus can be made smaller and lighter than the conventional apparatus and also assembled more easily. More precisely, when the above described structures of the first and second terminals 88 and 90 are compared with a case where the first and
20 second terminals 88, 90 are supported by any other member within the housing 10, for example, the image pickup substrate 62 facing the auxiliary power supply battery holder chamber 58 as shown in FIG. 8, various
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components 92 can be arranged on the any other component such as the image pickup substrate 62 facing the auxiliary power supply battery holder chamber 58, so that an efficiency of using a surface of the any other component can be improved.

Further, since the structure of such an auxiliary power supply battery holder chamber 58 is simple, it is possible to easily provide the first terminal 88 on the other end surface facing area 82 on the inner surface of the housing 10 through a space surrounded by the protruding end of the peripheral wall 80 before the fixed side wall 86 is fixed to the protruding end of the peripheral wall 80. The second terminal 90 can be easily provided on the fixed side wall 86 before the fixed side wall 86 is fixed to the protruding end of the peripheral wall 80.

If the fixed side wall 86 is made of electric terminal material and the second terminal 90 is formed by a part of the fixed side wall 86, the fixed side wall 86, together with the second terminal 90, can be easily formed, thus making it possible to decrease the number of components of the electronic image pickup apparatus according to the present invention to thereby further facilitate the assembly of the apparatus.

Next, a structure for sliding of the lens barrier 16 between the close position of FIG. 1 and the open position of FIG. 2 will be described in detail.

FIG. 9 illustrates a cross sectional view almost along the finder unit 26 and the image pickup lens unit 28 on the left end portion (right end portion in FIG. 1) of the electronic image pickup apparatus.

5 FIG. 9 shows the structure for sliding of the lens barrier 16 of the electronic image pickup apparatus of the embodiment according to the present invention between the close position of FIG. 1 and the open position of FIG. 2. FIG. 10 is a schematic cross-section view showing a conventional structure for sliding of a conventional lens barrier between its close position and its open position.

10 The structure for sliding of this embodiment has a pair of first and second guide grooves 100 and 102 arranged on portions located above and below a lens opening 12f for introducing light into the lens unit 12 on the outer surface of the front housing member 12. The first and second guide grooves 100 and 102 extend parallel with each other in a lateral direction.

15 The first guide groove 100 is located below the lens opening 12f on the front surface area in the outer surface of the front housing member 12 of the housing 10 and opens in a downward direction, indicated by an arrow C, which is one of cross directions crossing a front direction, indicated by an arrow F, in which the front surface area faces. The second guide groove 20 102 is located above the lens opening 12f and opens in

the above-described front direction. More specifically,
the first guide groove 100 is located in the vicinity
of the front surface area in the lower surface area of
the front housing member 12. The second guide groove
5 102 is located between the viewfinder window 12e and
the lens opening 12f in the front surface area both of
which are located above the lens opening 12.

Both upper and lower ends of the lens barrier 16
are engaged with the first and second guide grooves 100
10 and 102. To be more specific, the lower end portion of
the lens barrier 16 corresponding to the lower first
guide groove 100 has a first engaging claw 16a. The
first engaging claw 16a is inserted through the lower
opening of the first guide groove 100 into the first
15 guide groove 100, engaged with the first guide groove
100 in the above front direction F and the rear
direction indicated by an arrow B which is opposite
to the front direction F and slidable along the first
guide groove 100. The upper end portion of the lens
20 barrier 16 corresponding to the upper second guide
groove 102 has a second engaging claw 16b. The second
engaging claw 16b is inserted through the front opening
of the second guide groove 102 into the second guide
groove 102, engaged with the second guide groove 102
25 in a vertical direction corresponding to the above-
mentioned cross direction in this embodiment and
slidable along the second guide groove 102.

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After the lower first engaging claw 16a is inserted into the lower first guide groove 100, the lens barrier 16 rotates around the lower first engaging claw 16a engaged with the lower first guide groove 100 so that the upper second engaging claw 16b is directed to the upper second guide groove 102. By so doing, the upper second engaging claw 16b can be naturally and easily inserted into the upper second guide groove 102.

Thereafter, a separation protection member 104 is fixed to the front surface area of the front housing member 12 to cover an upper half of the upper second guide groove 102. The separation protection member 104 engages with an upper half of the upper second guide claw 102 on the upper end portion of the lens barrier 16 in the front direction F and protects the second engaging claw 102 from separating from the front opening of the second guide groove 102. In this embodiment, the separation protection member 104 is covered with a decorative sheet 12b and cannot be seen in the front surface area of the front housing member 12.

That is, in this embodiment, since the lower first guide groove 100 is located on the lower surface area in the outer surface of the front housing member 12 of the housing 10, it cannot be seen in a front view of the front housing 12. Although the upper second guide groove 102 is located on the front surface area in

the outer surface of the front housing member 12 of the housing 10, it is covered with the separation protection member 104 and the decorative sheet 12b so that the upper second guide groove 102 cannot be seen in the front view of the front housing member 12. Thus, the electronic image pickup apparatus of this embodiment has a streamlined appearance in the front view of the front housing 12 of the housing 10.

In addition, to rotatably engage the first and second engaging claws 16a and 16b of the upper and lower end portions of the lens barrier 16 with the paired first and second guide grooves 100 and 102 on the outer surface of the housing 10, prior to fixing the separation protection member 104 to the outer surface of the housing 10, the first engaging claw 16a on the lower end portion of the lens barrier 16 corresponding to the first guide groove 100 is inserted through the lower opening of the first guide groove 100 into the first guide groove 100 from the lower surface area in one of the cross directions crossing the front direction F and the second engaging claw 16b on the upper end portion of the lens barrier 16 corresponding to the second guide groove 102 in the front surface area is inserted through the front opening of the second guide groove 102 into the second guide groove 102 in the direction B opposite to the front direction F. Thereafter, the separation protection member 104

is fixed to the outer surface of the housing 10. Therefore, there is no need to apply strong force to the assembling work (That is, the engaging work for engaging the first and second engaging claws 16a and 16b of the both upper and lower end portions of the lens barrier 16 with the paired first and second guide grooves 100 and 102 on the outer surface of the housing 100, in this embodiment). The fact that no strong force is applied to the upper and lower end portions of the lens barrier 16 during assembling work makes the assembling work ease and the structure of the lens barrier 16 being simple. As a result, compared to the conventional apparatus, the electronic image pickup apparatus according to the present invention can be smaller in size and lighter in weight.

Moreover, the above-described structure for the slidable movement of the lens barrier between the close position shown in FIG. 1 and the open position shown in FIG. 2 can make a distance between the first and second guide grooves 100 and 102 short. The distance between them (which corresponds to the height in the vertical direction of the housing 10) is shorter than the moving distance of the lens barrier 16 in a width direction (which corresponds to the lateral direction of the housing 10 in this embodiment). If a force applied to the lens barrier 16 to move the barrier 16, is not applied to a center in the vertical

direction of the lens barrier 16, the couple of force generated on the upper and lower end portions of the lens barrier 16 becomes smaller. Thus, it is possible to always smoothly slide the lens barrier 16.

5 FIG. 9 also illustrates that the rear housing member 14 and the main body block 20 are connected to the front housing member 12 by the fixing screw 114 through the connector piece 54 of the rear housing member 14.

10 In a structure, shown in FIG. 10, for sliding a conventional lens barrier 110 between the close position and the open position, first and second engaging claws 110a and 110b on upper and lower end portions of the lens barrier 110 protrude to approach
15 each other and are engaged with first and second engaging grooves 112a, 112b formed in upper and lower surface areas in an outer surface of a housing 112, the engaging grooves 112, 112b being opened upward and downward and extending along the front surface area.
20 And, the engaging claws 110a, 110b are slidable along the first and second engaging grooves 112a, 112b.

 With such a conventional structure, to engage the first and second engaging claws 110a and 110b on the upper and lower end portions of the lens barrier 110
25 with the first and second engaging grooves 112a and 112b of the housing 112, the lens barrier 110 is pressed against the front surface area of the housing

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112 while the first and second engaging claws 110a and 110b on the upper and lower end portions of the lens barrier 110 are being directed to the upper and lower ends of the front surface area of the housing 112.

5 The upper and lower end portions of the lens barrier 110 slidably contact with the upper and lower ends of the front surface area of the housing 112 and thereby elastically bent the upper and lower end portions so as to widen the distance between the upper and lower end
10 portions of the lens barrier 110. Thereafter, the first and second engaging claws 110a and 110b are engaged with the first and second engaging grooves 112a and 112b of the housing 112 as shown in FIG. 10. In this conventional structure, since the upper and
15 lower end portions of the lens barrier 110 are forcibly and elastically bent, the upper and lower end portions must be formed to have large strength so that a weight of the lens barrier 110 is increased. As a result, a weight of the conventional electronic image pickup
20 apparatus having the structure for sliding the lens barrier 110 is increased.

Moreover, relatively strong force is required to forcibly and elastically bend the upper and lower end portions of the lens barrier 110. As a result, the
25 engaging work for engaging the first and second engaging claws 110a and 110b on the upper and lower end portions of the lens barrier 110 with the first and

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second engaging grooves 112a and 112b of the housing 112 becomes hard. In some cases, the upper and lower end portions of the lens barrier 110 are damaged while they are forcibly and elastically bent.

5 With such a conventional structure, it is necessary to make the height of the lens barrier 110 equal to that between the upper and lower surface areas of the housing 112. Due to this, if the width of the lens barrier 110 in its moving direction is relatively
10 smaller than the height of the lens barrier 110 and a force applied to the lens barrier 110 to move the barrier 110 is not applied to the center of the direction of the height of the lens barrier 110, then the large couple of force tends to occur on the
15 upper and lower end portions of the lens barrier 110. As a result, the lens barrier 110 cannot slide smoothly. If the width of the lens barrier 110 is relatively larger than the height of the lens barrier 110 to slide the lens barrier 110 smoothly, the weight of the lens
20 barrier 110 is increased to thereby increase the weight of the conventional electronic image pickup apparatus having the above described slidable structure for the lens barrier 110.

25 Now, a bearing structure for rotatably supporting the battery cap between a close position and an open position in the battery insertion opening formed in the right end portion (left end portion in FIG. 1) of

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the lower surface area on the outer surface of the front housing member 12 to take the main power supply batteries (not shown) in and out of the battery storage space 40 (see FIG. 4) provided inside the expanded right end portion (left end portion in FIG. 1) of the housing 10 in FIG. 1, will be described in detail.

FIG. 11 is an enlarged cross-sectional view showing the battery opening 120 formed in the right end portion (left end portion in FIG. 1) of the lower surface area on the outer surface of the front housing member 12 of FIG. 1 and showing the bearing structure for supporting the battery cap 122 rotatable between the close position and the open position in the battery opening 120. FIG. 12 is an enlarged, exploded perspective view of the battery opening 120, the bearing structure and the battery cap 122 of FIG. 11.

The bearing structure includes a pair of shaft supporting recess portions 114 provided in the lower surface area on the inner surface of the front housing member 12 of the housing 10 to face the lower end surface of the main body frame 20a. The shaft supporting recess portions 114 are spaced from each other by a predetermined distance in a direction in which the lower end surface of the main body frame 20a extends and have openings 114a covered with the lower end surface of the main body frame 20a in the housing 10, respectively. To be more specific, the paired

shaft supporting repress portions 114 of this embodiment are formed on rear end portions of right and left edges of the battery insertion opening 120 on the lower surface area of the inner surface of the front housing member 12 to face the lower end surface of the main body frame 20a, and are spaced apart for a predetermined distance from each other in the extending direction of the lower end surface of the main body frame 20a.

The battery cap 122 comprises a pair of rotation center shafts 122a concentrically protruding in the lateral direction from rear ends of right and left edges thereof. The paired center shafts 122a are inserted into the paired shaft supporting recess portions 114 through the radial direction openings 114a as indicated by two-dot chain line shown in FIG. 12 just before the front housing member 12, the rear housing member 14 and the main body block 20 are connected to one another as shown in FIG. 9 while assembling the electronic image pickup apparatus according to the embodiment of the present invention. When the front housing member 12, the rear housing member 14 and the main body block 20 shown in FIG. 4 are connected to one another as shown in FIG. 9, the radial direction openings 114a of the paired shaft supporting recess portions 114 are covered with the lower end surface of the main body frame 20a within

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the housing 10 as shown in FIG. 11. By so doing, the battery cap 122 can be rotatable around the paired rotation center shafts 122a set in the paired shaft supporting recess portions 114 shown in FIG. 11 between the close position for covering the battery insertion opening 120 and the open position for opening the battery insertion opening 120.

The paired rotation center shafts 122a of the battery cap 122 are prevented from separating from the radial direction openings 114a of the paired shaft supporting recess portions 114 by the lower end surface of the main body frame 20a within the housing 10.

The bearing structure for the battery cap 122 characterized as described above is quite simple since the bearing structure is composed only of a pair of shaft supporting recess portions 114 provided on the inner surface of the housing 10 and the main body frame 20 housed in the housing 10 and having the lower end surface covering the radial direction openings 114a of the shaft supporting recess portions 114. Such a simple bearing structure makes the electronic image pickup apparatus of this invention being smaller and lighter than the conventional apparatus and makes the assembling work of the electronic image pickup apparatus of this invention become simpler than that of the conventional apparatus.

Based on the embodiment according to the present

invention as described above in detail, the electronic image pickup apparatus according to the present invention can be described as follows. It is noted that reference numerals included in the following

5 descriptions correspond to those used in the above-described embodiment according to the present invention. However, they are added to make the characteristics of the apparatus being understood more better and should not be intended to limit the present invention to the

10 structural elements described in the above-described embodiment and indicated by the same reference members as those indicating the structural elements. The electronic image pickup apparatus according to the present invention should be defined only by the

15 meanings of the following descriptions.

1. The electronic image pickup apparatus according to the present invention comprises:

a main body frame (20a);

a housing housing (10) the main body frame (20a) and having a battery insertion opening (120) for taking

20 in and out batteries;

a shaft supporting recess portion (114) provided in a position on the inner surface of the housing (10) to face the main body frame (20a) and covered with the

25 main body frame (20a) within the housing (10); and

a battery cap (122) having a rotation center shaft (122a) rotatably supported by the shaft supporting

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recess portion (114) on the inner surface of the housing (10), the center shaft (122a) being prevented from separating from the shaft supporting recess portion (114) by the main body frame (20a) within the housing (10), and the battery cap (122) being rotatable around the rotation center shaft (122a) between a close position for covering the battery opening (120) of the battery opening (120).

2. In the apparatus structured as described in the item 1, the battery cap (122) has a pair of rotation center shafts (122a) arranged concentrically and directed opposite each other; a pair of shaft supporting recess portions (114) having radial direction openings (114a) covered with the main body frame (20a) within the housing (10), respectively, are provided in two positions on the inner surface of the housing (10) to face the main body frame (10a), respectively; and the paired rotation center shafts (122a) of the battery cap (122) can be rotatably supported by the paired shaft supporting recess portions (114) on the inner surface of the housing (10).

With such a structure, the battery cap (122) can be supported firmly and rotated smoothly on the housing (10).

3. The electronic image pickup apparatus according to the present invention comprises:

a housing (10) housing a lens unit (28) and having a lens opening (12f) for introducing light into the lens unit (28);

5 a pair of guide grooves (100, 102) extending parallel with each other on an outer surface of the housing (10) with the lens opening (12f) being interposed therebetween; and

10 a lens barrier (16) having both end portions (16a, 16b) engaged with the paired guide grooves (100, 102) and moving between a close position for closing the lens opening (12f) and an open position for opening the lens opening (12f) with the both end portions (16a, 16b) being guided by the paired guide grooves (100, 102), wherein

15 on the outer surface of the housing (10), one (100) of the paired guide grooves (100, 102) opens in a cross direction (C) crossing a front direction (F) to which a front surface area of the housing (10), in which the lens opening (12f) is formed, is directed, 20 and the other (102) of the paired guide grooves (100, 102) opens to the front direction (F),

one end portion (16a) of the both end portions (16a, 16b) of the lens barrier (16) corresponding to the one guide groove (100) is inserted into and engaged 25 with the one guide groove (100), and is slidable along the one guide groove (100),

the other end portion (16b) of the both end

portions (16a, 16b) of the lens barrier (16) corresponding to the other guide groove (102) is inserted into and engaged with the other guide groove (102), and slidable along the other guide groove (102),
5 and

a separation protection member (104) is fixed on the outer surface of the housing (10) so as to engage with the other end portion (16b) of the lens barrier (16) in the front direction (F) and to prevent the
10 other end portion (16b) of the lens barrier (16) from separating from the opening of the other guide groove (102).

4. In the apparatus structured as described in the item 3, it is preferable that the one guide groove (100) is formed in a lower surface area located below
15 the front surface area on the outer surface of the housing (10) and extending in directions (F, B) crossing the front surface area, and that the other guide groove (102) is formed in the front surface area
20 on the outer surface of the housing (10).

With such a structure, when observing the lens opening (12f) in the front surface area on the outer surface of the housing (10) of the electronic image pickup apparatus, that is, observing the housing (10)
25 in a direction (B) opposite to the front direction (F), the one guide groove (100) cannot be seen and also the other guide groove (102) cannot be seen due to the

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presence of the separation protection member (104) and a decorative sheet (12b) for covering the separation protection member (104). Thus, the housing (10) of the electronic image pickup apparatus presents a streamlined appearance.

Based on the embodiment according to the present invention, the electronic image pickup apparatus according to the present invention can be further described as follows.

5. The electronic image pickup apparatus according to the present invention comprises:

a battery holder (76b) holding a flat battery (74) at a part of a peripheral surface of the battery (74) and a part of both end surfaces thereof, the flat battery (74) having electrodes on the peripheral surface thereof and on one end surface thereof; and

a housing (10) including a battery holder chamber (58) having a battery insertion opening (78) for putting the battery holder (76b) in and out of the chamber (58), the battery holder (76b) being put in and out of the chamber (58) through the battery holder opening (78) while the peripheral surface of the battery (74) is directed to the battery holder opening (78), the battery holder chamber (58) further having a first terminal (88) for contacting one electrode on the peripheral surface of the battery (74) held by the battery holder (76b) inserted from the battery holder

insertion opening (78) into the chamber (58), and the battery holder chamber (58) more further having a second terminal (90) for contacting the other electrode on one end surface of the battery (74) held by the holder (76b) inserted from the opening (78) into the chamber (58).

6. In the apparatus structured as described in item 5, it is preferable that the battery holder chamber (58) of the housing (10) is defined by a peripheral wall (80) formed by protruding from the inner surface of the housing (10) and facing the peripheral surface of the battery (74) of the battery holder (76b) within the battery holder chamber (78) in directions except for a direction (M) facing the battery holder opening (78), an other end surface facing area (82) surrounded by the peripheral wall (80) on the inner surface of the housing (10) and facing the other end surface of the battery (74) of the battery holder (76b) within the battery holder chamber (58) and a fixed side wall (86) fixed to a protruding end of the peripheral wall (80) and facing the one end surface of the battery (74) of the battery holder (76b) within the battery holder chamber (58), and that the first terminal (88) is provided on the other surface facing area (82) on the inner surface of the housing (10) and the second terminal (90) is provided on the fixed side wall (86).

Since a structure of the battery holder chamber

ORIGINAL DOCUMENT

a housing (10) housing image display means (18)
for displaying an image based on an image signal
inputted thereto; and

5 a tripod support (60) having a tripod hole and
provided at the housing (10), wherein
the image display means (18) has at least two
protruding pieces (64) protruding in the same direction,
and

10 the tripod support (60) is arranged between at
least the two protruding pieces (64) of the image
display means (18) within the housing (10).

15 The tripod support (60) protruding between at
least two protruding pieces (64) of the image display
means (18) in the housing (10) improves an efficiency
of using a space within the housing (10) and
consequently contributes to realize a smaller, lighter
electronic image pickup apparatus. Furthermore, it
provides enough space for an arrangement of structural
elements within the housing (10), thereby facilitating
20 an assembly of the electronic image pickup apparatus.

9. In the electronic image pickup apparatus
structured as described in item 8, it is preferable
that: the tripod hole of the tripod support (60) is
opened in a cross surface area in the outer surface of
25 the housing (10), the cross surface are extending in
directions (F, B) crossing a rear surface area, to
which an image display portion (18a) of the image

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display means (18) is exposed, in the outer surface of the housing (10); the image display means (18) protrudes the at least two protruding pieces (64) toward the cross surface area within the housing (10);

5 a main body frame (20a) is housed in the housing (10); and the image display means (18) is supported by the main body frame (20a) through the at least two protruding pieces (64).

By supporting the image display means (18) on

10 the main body frame (20a) through the at least two protruding pieces (64), the assembly of the electronic image pickup apparatus according to the present invention can be further facilitated.

10. In the electronic image pickup apparatus

15 structured as described in item 8 or 9, the image display means (18) can be a liquid crystal display device.

Based on the embodiment according to the present invention, the electronic image pickup apparatus of the

20 present invention can be further described as follows.

11. The electronic image pickup apparatus according to the present invention comprises:

a housing (10) housing a finder unit (26), electronic image pickup means and image display means

25 (18) and provided with an image display operating member (14c) for operating the image display means (18) on an outer surface thereof, wherein

an eyepiece window (14b) of the finder unit (26) is located in a left side of an image display portion (18a) of the image display means (18) on a rear surface area, to which the image display portion (18a) of the
5 image display means (18) is exposed, in the outer surface of the housing (10), and

the image display operating member (14c) is located in a right side of the image display portion (18a) on the rear surface area.

10 With such a structure, a user of the electronic image pickup apparatus can look at the eyepiece window (14b) of the finder unit (26) with his or her right eye while holding a right end portion of the housing (10) of the apparatus with its right hand. The user can
15 also freely operate the image display operating member (14c) with its right hand. In other words, the user can easily use the electronic image pickup apparatus of the present invention even when picking up an image by the electronic image pickup means and when displaying
20 the image by the image display means (18).

12. In the electronic image pickup apparatus structured as described in item 11, it is preferable that: the eyepiece window (14b) of the finder unit (26) is located in the left side of the image display
25 portion (18b) in the rear surface area on the outer surface of the housing (10) and in the vicinity of an upper end of the rear surface area; and the image

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display operating member (14c) is located in the right side of the image display portion (18a) in the rear surface area on the outer surface of the housing (10) and in the vicinity of the upper end of the rear surface area.

With such a structure, it is possible to create a space for arranging a photographic lens unit (28) for the electronic image pickup means below the finder unit (26) in the left side of the image display means (18) within the housing (10). This can reduce outer dimensions of the housing (10), in particular, a thickness of the housing (10). Besides, the user can operate the image display operating member (14c) easily with its thumb of its right hand while holding the right end portion of the housing (10) with its right hand.

Based on the embodiment according to the present invention as described above in detail, the electronic image pickup apparatus according to the present invention can be further described as follows.

13. The electronic image pickup apparatus according to the present invention comprises:

a housing (10) housing a photographic lens unit (28) and image display means (18), wherein the photographic lens unit (28) and the image display means (18) are arranged so as not to overlap each other in a direction along an optical axis of the photographic

lens unit (28).

With such a structure, the relatively thick photographic lens unit (28) and the image display means (18) do not overlap each other in the housing (10) in the direction along the optical axis of the photo-graphic lens unit (28). As a result, the outer dimensions of the housing (10), in particular, the thickness of the housing (10), can be reduced.

Additional advantages and modifications will readily occurs to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details and representative embodiments shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

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CLAIMS

1. An electronic image pickup apparatus comprising:

a housing housing a lens unit and having a lens
5 opening for introducing light into the lens unit;

a pair of guide grooves extending parallel with
each other on an outer surface of the housing with the
lens opening interposed therebetween; and

a lens barrier having both end portions engaged
10 with the paired guide grooves and being movable between
a close position for closing the lens opening and an
open position for opening the lens opening while the
both end portions being guided by the paired guide
grooves, wherein

15 one of the paired guide grooves opens in a cross
direction crossing a front direction to which a front
surface area, in which the lens opening is formed, on
the outer surface of the housing, is directed, and the
other of the paired guide grooves opens in the front
20 direction on the outer surface of the housing,

one of the both end portions of the lens barrier
corresponding to the one guide groove is inserted into
and engaged with the one guide groove, and is slidable
along the one guide groove,

25 the other of the both end portions of the lens
barrier corresponding to the other guide groove is
inserted into and engaged with the other guide groove,

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and slidable along the other guide groove, and

5 a separation protection member is fixed on the
outer surface of the housing (10) to engage with the
other end portion of the lens barrier in the front
direction and to prevent the other end portion of the
lens barrier from separating from the opening of the
other guide groove.

10 2. An apparatus according to claim 1, wherein the
one guide groove is formed in a lower surface area,
located below the front surface area and extending in
directions crossing the front surface area, in the
outer surface of the housing and wherein

the other guide groove is formed in the front
surface area in the outer surface of the housing.

ABSTRACT OF THE DISCLOSURE

An electronic image pickup apparatus includes a housing housing a lens unit and having a lens opening for introducing light into the lens unit, a pair of
5 guide grooves extending parallel with each other on an outer surface of the housing with the lens opening interposed therebetween, and a lens barrier having both end portions engaged with the paired guide grooves and being movable between a close position for closing the
10 lens opening and an open position for opening the lens opening while the both end portions being guided by the paired guide grooves. One guide groove opens in a cross direction crossing a front direction to which a front surface area, in which the lens opening is formed,
15 on the outer surface of the housing, is directed, and the other guide groove opens in a front direction on the outer surface of the housing. One end portion of the lens barrier corresponding to the one guide groove is inserted into and engaged with the one guide groove,
20 and is slidable along the one guide groove. The other end portion of the lens barrier corresponding to the other guide groove is inserted into and engaged with the other guide groove, and slidable along the other guide groove. A separation protection member is fixed
25 on the outer surface of the housing to engage with the other end portion of the lens barrier in the front direction and to prevent the other end portion of the

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lens barrier from separating from the opening of the
other guide groove.

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ABSTRACT OF THE DISCLOSURE

An electronic image pickup apparatus includes a housing which houses a main body from and has a battery insertion opening, a shaft supporting recess provided in an inner surface of the housing to be covered with the frame within the housing, and a battery cap having a shaft rotatably supported by the recess. Alternatively, the apparatus includes a holder holding a flat battery, and a housing including a chamber having an opening for putting the holder in and out of the chamber while a periphery of the battery is directed to the opening, the chamber having a first terminal to contact the battery periphery in the holder and a second terminal to contact one end surface thereof. Another apparatus includes a housing which houses an image display, and a tripod support provided at the housing, the image display having two pieces protruding in the same direction, and the support being arranged between two pieces. Another apparatus includes an eyepiece window of a finder unit in a left side of an image display on a rear surface of the housing, and a display operating member in a right side thereof on the rear surface.

Another apparatus includes a lens unit and an image display in a housing and arranged so as not to overlap each other in a direction along an optical axis of the lens unit.

FIG. 1

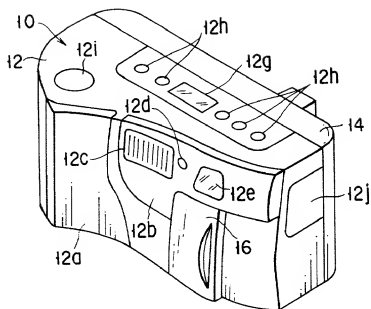


FIG. 2

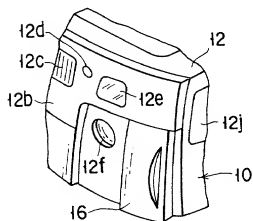
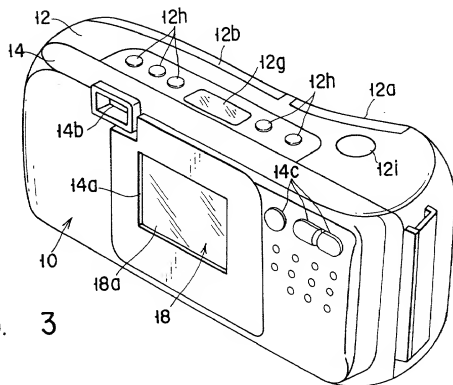


FIG. 3



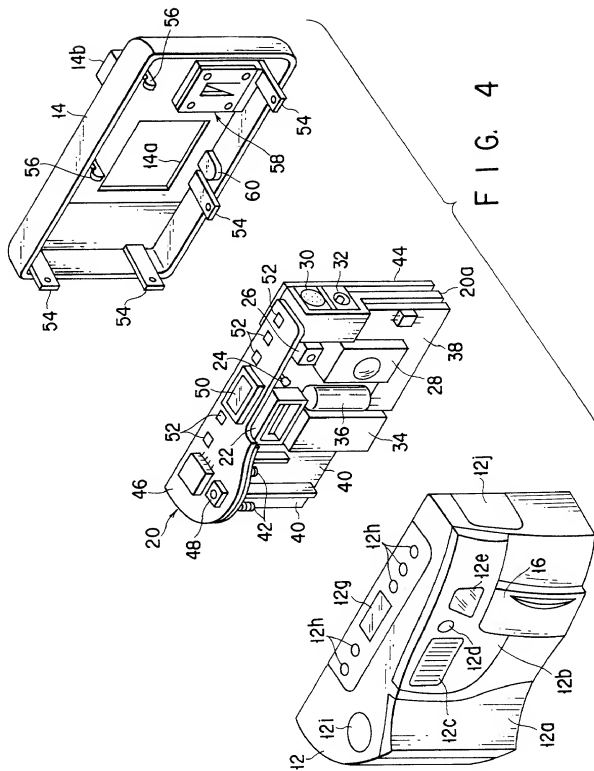


FIG. 4

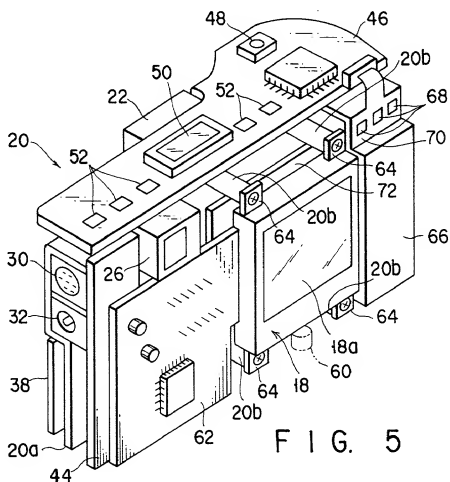


FIG. 5

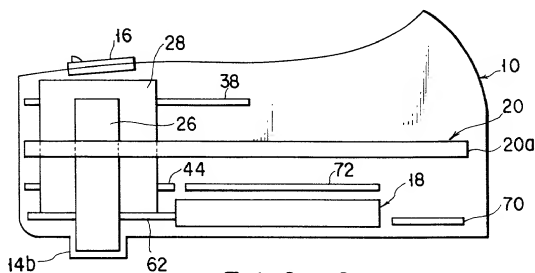


FIG. 6

FIG. 10

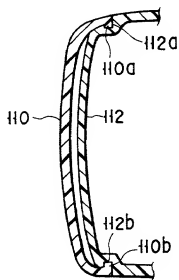


FIG. 11

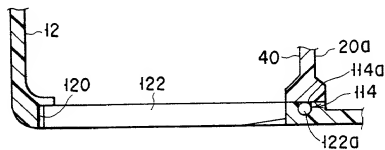
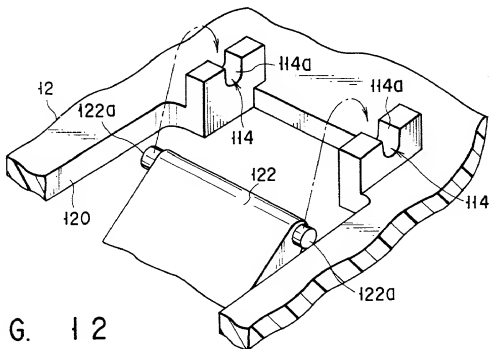


FIG. 12



DECLARATION FOR PATENT APPLICATION

As a below named inventor, I declare:
that I verily believe myself to be the original, first and sole (if only one individual inventor is listed below) or an original, first and joint inventor (if more than one individual inventor is listed below) of the invention in

ELECTRONIC IMAGE PICKUP APPARATUS

the specification of which is attached hereto unless the following box is checked.

☐ was filed on _____ as United States Application
or PCT International Application No. _____, and
was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information of which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365 (b) of any foreign application(s) for patent or inventor's certificate, or 35 U.S.C. 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

<u>Country</u>	<u>Category</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Priority Claim</u>
Japan	Patent	8-211443	August 9, 1996	Yes

And I hereby appoint Stephen H. Frishauf (Reg. No. 16,233), Leonard Holtz (Reg. No. 22,974), Herbert H. Goodman (Reg. No. 17,081), Thomas Langer (Reg. No. 27,264), Marshall J. Chick (Reg. No. 26,853), Walter J. Baum (Reg. No. 20,641), Richard S. Barth (Reg. No. 28,180) and Douglas Holtz (Reg. No. 33,902), each of whose address is 767 Third Avenue - 25th Floor, New York, N.Y. 10017-2023, or any one of them, my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent & Trademark Office connected therewith, and request that correspondence be directed to Frishauf, Holtz, Goodman, Langer & Chick, P.C., 767 Third Avenue - 25th Floor, New York, N.Y. 10017-2023.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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DECLARATION FOR PATENT APPLICATION

I declare further that my post office address is at c/o
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THAT my citizenship and residence are as stated below next to my name:

Inventor: (Signature)

Date

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101. Charme-Kunitachi.
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106. Shimmei-Okabe-Mansion II.
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